January 1992

Idaho National Engineering Laboratory

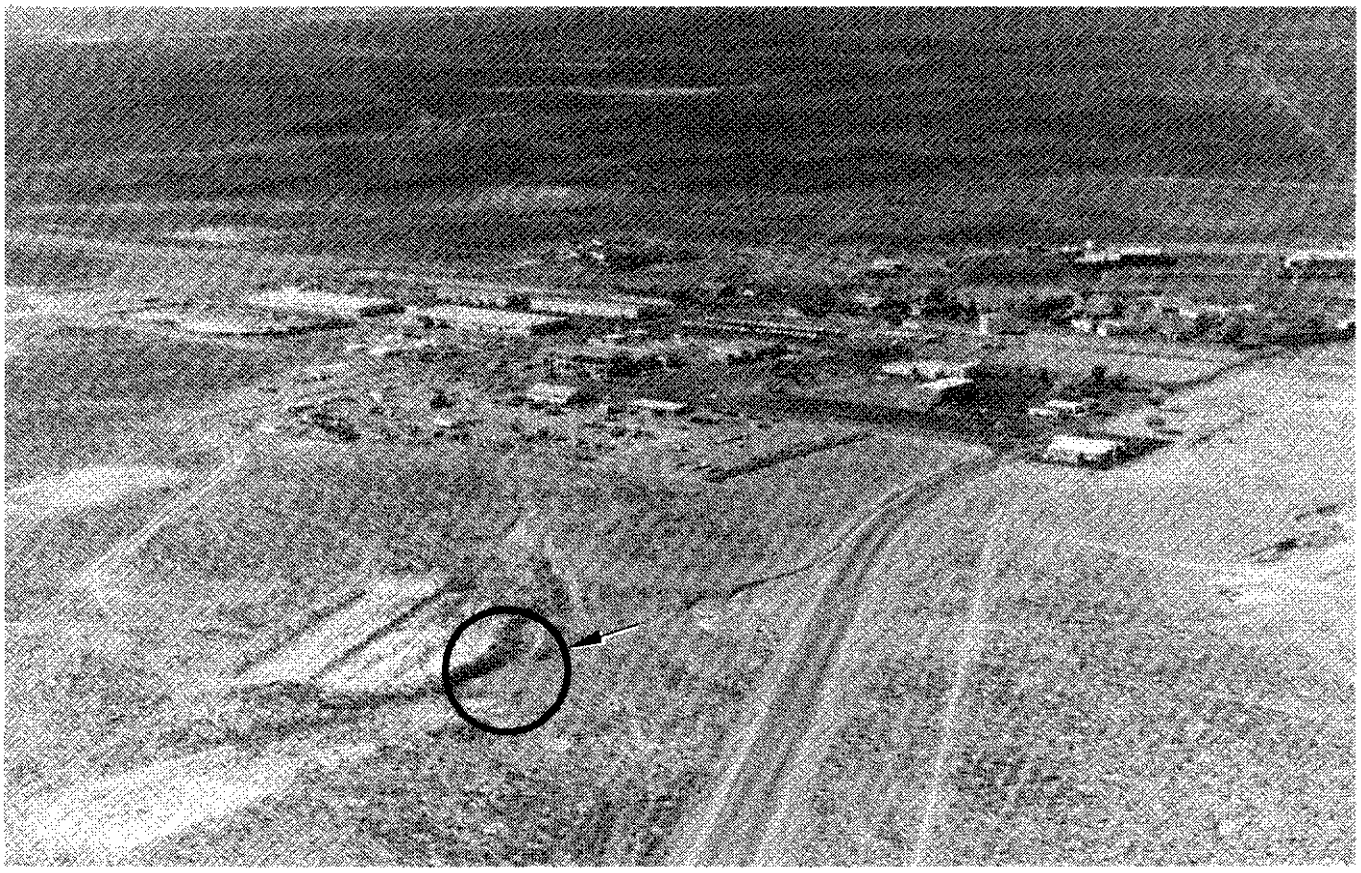
IDAHO DEPARTMENT OF HEALTH AND WELFARE
DIVISION OF ENVIRONMENTAL QUALITY

Record of Decision

Central Facilities Area Motor Pool Pond

Operable Unit 4-11
Waste Area Group 4

Idaho National Engineering Laboratory
Idaho Falls, Idaho



Aerial photo of the Central Facilities Area; arrow indicates the location of the Motor Pool Pond.

DECLARATION OF THE RECORD OF DECISION

Site Name and Location

Central Facilities Area Motor Pool Pond
Operable Unit 4-11
Waste Area Group 4
Idaho National Engineering Laboratory
Idaho Falls, Idaho

Statement of Basis and Purpose

This decision document presents the remedial action selected for the Central Facilities Area Motor Pool Pond at the Idaho National Engineering Laboratory (INEL), Operable Unit 4-11. This alternative was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act as amended by the Superfund Amendments and Reauthorization Act, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The decision is based on the information in the site Administrative Record, which is located in the INEL Technical Library, Idaho Falls, Idaho.

The lead agency in this decision is the U.S. Department of Energy (DOE). The U.S. Environmental Protection Agency (EPA) and the Idaho Department of Health and Welfare (IDHW) have participated in the scoping of the site investigations and the evaluation of remedial investigation data. The IDHW concurs with the selected remedy.

Description of the Selected Remedy

The DOE has determined that no further remedial action is necessary at the CFA Motor Pool Pond to ensure protection of human health and the environment. This decision is based on the results of the human health and ecological risk assessments, which indicate that conditions at the site pose no unacceptable risk to human health or the environment. The EPA has approved the DOE decision; the IDHW concurs.

Declaration

It has been determined that no remedial action is necessary at this operable unit to ensure protection of human health and the environment. This determination is based on the results of the site-specific risk assessment/ however, a risk assessment using default exposure factors indicates that hazardous substances may remain on the site above health-based levels. Therefore, five-year reviews will be conducted to confirm the assumptions used to arrive at the no remedial action decision.

Signature sheet for the foregoing Record of Decision for Operable Unit 4-11 at the Idaho National Engineering Laboratory by the United States Department of Energy and approved by the United States Environmental Protection Agency, with concurrence by the Idaho Department of Health and Welfare. The Operable Unit consists of the Central Facilities Area Motor Pool Pond at the Idaho National Engineering Laboratory.

DEC 31 1992

Augustine A. Pitrolo Date
Manager
Department of Energy, Idaho Field Office

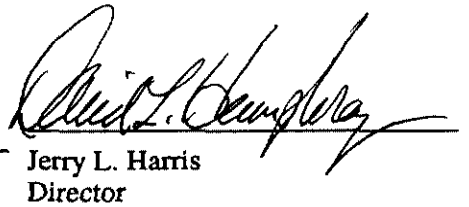
Signature sheet for the foregoing Record of Decision for Operable Unit 4-11 at the Idaho National Engineering Laboratory by the United States Department of Energy and approved by the United States Environmental Protection Agency, with concurrence by the Idaho Department of Health and Welfare. The Operable Unit consists of the Central Facilities Area Motor Pool Pond at the Idaho National Engineering Laboratory.

Dana Rasmussen 12/31/92

Dana Rasmussen
Regional Administrator, Region 10
Environmental Protection Agency

Date

Signature sheet for the foregoing Record of Decision for Operable Unit 4-11 at the Idaho National Engineering Laboratory by the United States Department of Energy and approved by the United States Environmental Protection Agency, with concurrence by the Idaho Department of Health and Welfare. The Operable Unit consists of the Central Facilities Area Motor Pool Pond at the Idaho National Engineering Laboratory.



1/20/93

Jerry L. Harris
Director
Idaho Department of Health and Welfare

Date

TABLE OF CONTENTS

DECISION SUMMARY

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
COCA	Consent Order and Compliance Agreement
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ESRP	Eastern Snake River Plain
FFA/CO	Federal Facility Agreement and Consent Order
FR	Federal Register
IDHW	Idaho Department of Health and Welfare
INEL	Idaho National Engineering Laboratory
mg/kg	Milligrams per kilogram
µg/kg	Micrograms per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan)
NPL	National Priorities List
OU	Operable Unit
PCB	Polychlorinated biphenyl
pCi/g	Picocuries per gram
pCi/L	Picocuries per liter
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RfD	Reference dose
ROD	Record of Decision
UCL	Upper confidence limit
VOC	Volatile Organic Compound
WAG	Waste Area Group

DECISION SUMMARY

1. SITE NAME, LOCATION, AND DESCRIPTION

The Idaho National Engineering Laboratory (INEL) is a U.S. Department of Energy facility that encompasses approximately 2,305 square kilometers (890 square miles) in southeastern Idaho (see Figure 1). The population centers closest to the INEL Central Facilities Area (CFA) include Atomic City (11 mi southeast), Arco (18 mi west), Howe (15 mi north), Mud Lake (32 mi northeast), and Terreton (34 mi northeast). The nearest large population center is Idaho Falls (population 46,000), located approximately 48 km (32 mi) to the east. The INEL is currently classified for industrial and mixed use by the Bureau of Land Management, and has been designated as a National Environmental Research Park.

The INEL is located in the northeastern portion of the Eastern Snake River Plain (ESRP) in southeastern Idaho. The ESRP is a volcanic plateau consisting of a series of basaltic lava flows with sedimentary interbeds. The topography of the INEL is generally flat to gently rolling, with elevations ranging from 1,585 m (5,200 ft) in the northeast to 1,450 m (4,750 ft) in the southwest. In the vicinity of CFA, the topography is flat, with the Big Lost River floodplain lying to the west and north and gently rolling basalt plains to the south and east. Elevations range from 1,500 m (4,920 ft) to 1,510 m (4,960 ft). Soils in the vicinity of CFA are thin and poorly developed, overlying alluvial deposits of sand, silt, and gravel.

The Snake River Plain Aquifer underlies the INEL and has been designated as a sole source aquifer pursuant to the Safe Drinking Water Act. The depth to the aquifer varies from 61 m (200 ft) in the northern portion of the INEL to 270 m (900 ft) in the southern portion; the depth to the aquifer in the CFA area is approximately 146 m (480 ft). Groundwater in this aquifer generally flows to the southwest.

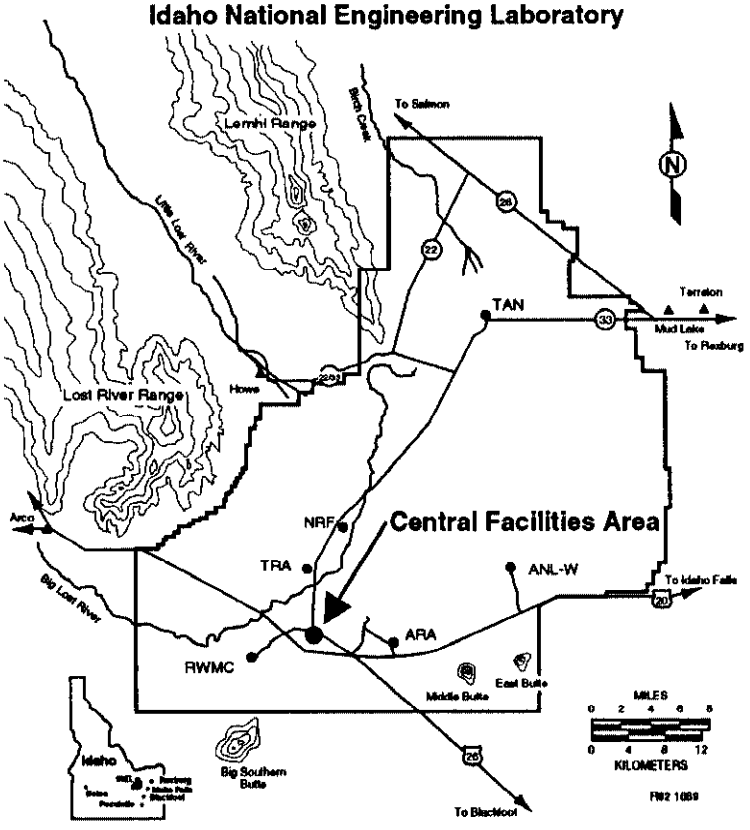


Figure 1. Location of the Central Facilities Area at the INEL.

The Central Facilities Area is located in the south central portion of the INEL near the intersection of U.S. Highways 20 and 26. The CFA is an administrative and support area that includes security facilities, environmental chemistry laboratories, a motor pool and maintenance shop, a general warehouse, and other support facilities.

The CFA Motor Pool Pond is located in an abandoned gravel pit approximately 366 m (1,200 ft) east of the CFA Equipment Yard (Figure 2). A small pond, approximately 36 by 18 m (120 by 60 ft), formed in the low spot when wastes were being discharged. Currently, the pond is typically dry; however, runoff may temporarily accumulate in the pond after storm events and during spring thaws. Waste water discharged to the pond originated at the CFA Service Station (Building CF-664). A 20-cm (8-in.) diameter concrete pipe extends southeast from the Service Station approximately 322 m (1,056 ft) and discharges to a ditch. The ditch extends approximately 68 m (225 ft) to an abandoned gravel pit and then continues for an additional 99 m (325 ft) to a low spot along the south side of the pit. The ditch ranges from 1 m (3 ft) deep at the pipe outlet to approximately 2 m (6 ft) deep near the pond inlet. The bottom of the ditch is 1 to 2 m (3 to 6 ft) wide. Sediments excavated from the ditch were placed along the north side of the ditch. This material was apparently removed to improve the flow of wastewater through the ditch. The remedial investigation (RI) focused on the characterization of soils and surficial sediments within this unlined pond and drainage ditch.

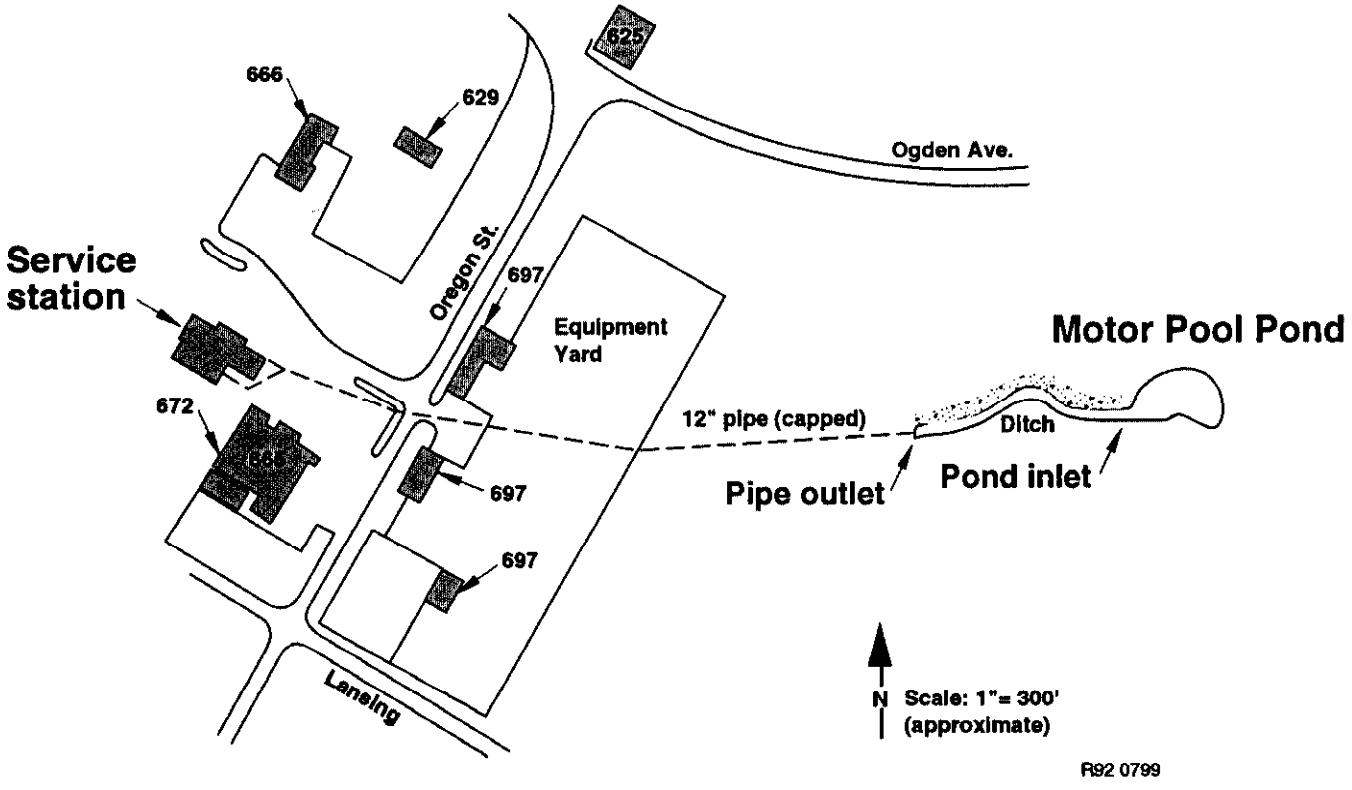


Figure 2. Location of the Central Facilities Area Motor Pool Pond.

2. SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 Enforcement Activities

Under the INEL Consent Order and Compliance Agreement (COCA) signed by the DOE, U.S. Environmental Protection Agency (EPA), and U.S. Geological Survey in July 1987, the Motor Pool Pond was classified as a Land Disposal Unit and was listed as COCA Unit CFA-05. The release of contaminants to the CFA Motor Pool Pond was first identified and evaluated during investigations conducted in accordance with the COCA.

On July 14, 1989, the INEL was proposed for inclusion on the National Priorities List (NPL) in 54 *Federal Register* (*FR*) 29820. The listing was proposed by the EPA under the authority granted by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986. The final rule that placed the INEL on the NPL was published in November 1989 in 54 *FR* 44184.

In December 1991, the DOE, EPA, and IDHW signed the Federal Facility Agreement and Consent Order (FFA/CO). The FFA/CO supersedes the COCA and provides enforceable schedules and strategies for implementation of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) at the INEL.

2.2 Site History and Investigations

From 1951 until 1985, the CFA Motor Pool Pond received wastes from two sumps located at the CFA Service Station (CFA 664 - See Figure 2). One of the sumps is located in the Bus Wash Bay and collected wastes from bus washes and floor drains in the adjacent Service Bay. The Service Bay was used to perform routine servicing of fleet vehicles. The second sump is located outside the station and collected wastes from the Steam Cleaning Bay and water from roof downspouts. In late 1985, the wastes were diverted through an oil/water separator to a sanitary sewer line connected to the Sewage Treatment Plant, and discharge to the Motor Pool Pond ceased.

During the 35-year service life of the Motor Pool Pond, the waste stream mainly consisted of wastewater from washing vehicles. According to Service Station personnel, the waste volumes were highest between 1978 and 1985, when automatic washing systems were in place at the Service Station. The automatic systems enabled washing of up to 30 buses and 10 cars and trucks per day. These washes are estimated to have generated up to 15,900 L (4,200 gal) of wastewater per day that were discharged to the pond.

The wastes from vehicle washes can be assumed to have contained metals and organic compounds associated with road dust, oil, and grease. Although the Service Station was not used to decontaminate radioactively contaminated vehicles, some residual radioactive contamination may have been removed during routine washes. This may have occurred because this residual contamination was not detected by hand-held instruments that are used to check vehicles leaving radioactively contaminated areas.

The CFA Motor Pool Pond was sampled as part of an INEL-wide preliminary assessment of waste streams conducted in 1982 and 1983. One surface water sample and one surface soil/sediment sample were collected from the CFA Motor Pool Pond and analyzed for metals and organic compounds. The pond was sampled again in 1988 as part of a DOE Environmental Survey, designed to rank environmental risks at DOE facilities. Nine sediment samples were collected in the Motor Pool Pond. Samples were analyzed for volatile organics using the methodology given in the Contract Laboratory Program Statement of Work dated July 1987 and Appendix D of the DOE Environmental Survey Manual.

Radiation surveys of the CFA Motor Pool Pond were conducted during periods when the pond contained water and when the pond was dry. The most recent survey at the CFA Motor Pool Pond, which was performed on September 4, 1991, indicated only background levels of radiation. No water was in the pond during the 1991 survey. The survey was conducted using portable Geiger-Muller detectors, capable of detecting gamma and high energy beta radiation.

In 1989, samples were collected from soils and sediments in and around the CFA Motor Pool Pond to support Resource Conservation and Recovery Act (RCRA) closure activities under the COCA. These samples were evaluated for the CERCLA site characterization. These samples were collected at the surface, at intermediate depths, and from sediments just above bedrock, which varies from 0.6 to 5.5 m (2 to 18 ft) below the surface. Sample locations included the discharge pipe outlet, the ditch, sediment excavated from the ditch, pond sediments, and the northern perimeter of the pond. In addition, ten biased soil samples were collected in an area that was not affected by CFA activities to calculate background metal concentrations.

3. HIGHLIGHTS OF COMMUNITY PARTICIPATION

On June 26, 1992, a document containing Proposed Plans for three INEL sites, including the CFA Motor Pool Pond, was released to the public. The plan was mailed to approximately 6,500 individuals on the INEL mailing list, with a cover letter from the Director of the Environmental Restoration Division, DOE Idaho Field Office. The public comment period for the Proposed Plan was initially scheduled from July 6 to August 5, 1992. An extension was requested due to errors identified in a table in the Proposed Plan. The public comment period was extended to September 8, 1992. A corrected table was provided to those on the mailing list who received the Proposed Plan. Community participation activities have been conducted as required by Sections 113(k)(2)(B)(i-v) and 117 of CERCLA and part XXIV of the FFA/CO.

The CFA Motor Pool Pond Proposed Plan summarized the results of the human health risk assessment, which was based on modeled exposures to contaminants identified in the pond sediments. The modeling indicated that the contaminants at the site pose no unacceptable risk to human health and the environment. Therefore, the DOE, EPA, and IDHW recommended No Action for the Motor Pool Pond in the Proposed Plan.

The Notice of Availability for the Proposed Plan was published in the following newspapers:

- *The Post Register* (Idaho Falls) - July 1, 1992
- *The Idaho State Journal* (Pocatello) - July 2, 1992
- *Times News* (Twin Falls) - July 1, 1992
- *Idaho Statesman* (Boise) - July 2, 1992
- *Daily News* (Moscow-Pullman) - July 11 and 12, 1992
- *South Idaho Press* (Burley) - July 1, 1992
- *The Lewiston Morning Tribune* (Lewiston) - July 1, 1992.

Copies of the plan are available in the Administrative Record file in the INEL Technical Library, 1776 Science Center Drive, Idaho Falls. Copies of the file are also available in the INEL Information Repository section of public libraries in Idaho Falls, Pocatello, Twin Falls, Boise, Shoshone-Bannock Library at Fort Hall, Idaho State Library in Boise, and the University of Idaho Library in Moscow.

Technical briefings on the Proposed Plan were held on July 13 in Twin Falls, on July 14 in Moscow, and on July 15 in Pocatello. The Twin Falls briefing was presented to the Twin Falls City Council and was open to the public; the Moscow and Pocatello briefings were presented to the public.

Articles explaining the Proposed Plan for the CFA Motor Pool were printed in the May and July 1992 issues of the *INEL Reporter* newsletter, which is distributed to members of the public on the INEL mailing list. Additionally, during the public comment period (from July 6 to September 8), public meetings on the Proposed Plan were held in Idaho Falls on July 20, Burley on July 21, Boise on July 22, and Moscow on July 23. An INEL press release, informing members of the public of the upcoming meeting in their area, was distributed to state-wide media. Personal telephone calls were made by INEL Outreach Offices in Pocatello, Twin Falls, and Boise to inform key representatives from community groups of the opportunity for public comment.

The notices of the times and dates of public meetings were published in the following newspapers:

- *The Post Register* (Idaho Falls) - July 17, 1992
- *The Idaho State Journal* (Pocatello) - July 17, 1992
- *Times News* (Twin Falls) - July 20, 1992
- *Idaho Statesman* (Boise) - July 20, 1992
- *Daily News* (Moscow-Pullman) - July 21, 1992
- *South Idaho Press* (Burley) - July 20, 1992
- *The Lewiston Morning Tribune* (Lewiston) - July 21, 1992,

At the meetings, representatives from the DOE, EPA, and IDHW discussed the Proposed Plan, answered questions, and received public comment. Verbatim transcripts of each public meeting were prepared by a court reporter and are available, along with the written comments, in the Administrative Record. Comments received from the public were considered in the final decision and have been summarized and addressed in the Responsiveness Summary attached to this Record of Decision (Appendix A).

4. SCOPE AND ROLE OF OPERABLE UNIT AND RESPONSE ACTION

Under the FFA/CO, the INEL was divided into 10 Waste Area Groups (WAGs) to better manage the investigation of potential waste sites. Each WAG contains several operable units (OUs) which consist of one or more potential waste sites. This strategy allows the DOE, EPA, and IDHW to focus available cleanup resources on those areas that potentially pose an unacceptable risk to human health and the environment. WAG 4 consists of 13 OUs located at CFA. The CFA Motor Pool Pond is designated as OU 4-11.

OU 4-11 includes the excavated sediments along the ditch and the sediments at the discharge pipe outlet, in the ditch, and in the pond. Data collected for the RI risk assessment indicate that the contaminated sediments within these areas of the CFA Motor Pool Pond do not pose an unacceptable risk to human health and the environment. Therefore, based on the results of the RI and risk management considerations, it was determined that the CFA Motor Pool Pond required no further action to protect human health and the environment. Any impacts from past releases to the pond that may affect the subsurface (vadose zone) or groundwater will be evaluated in OU 4-13, the WAG 4 Comprehensive Remedial Investigation/Feasibility Study (RI/FS).

5. SITE CHARACTERISTICS

The results of the 1982, 1988, and 1989 site investigations indicate that the CFA Motor Pool Pond sediments are contaminated with metals, volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), and radionuclides. The contamination appears to be concentrated in sediments in the ditch and the excavated sediments adjacent to the ditch.

In 1989, 41 samples (excluding replicate samples) of the Motor Pool Pond sediments were collected and analyzed for metals and for VOCs. Thirty-eight of the samples were analyzed for gamma-emitting radionuclides, and three

for alpha-emitting radionuclides (See Table 1). Four samples were also collected and analyzed for a broad range of metals and organic compounds (Appendix IX of 40 Code of Federal Regulations 264). In addition, 10 soil samples were collected south of the pond and analyzed to establish background concentrations of metals (Figure 3).

Barium, beryllium, cadmium, chromium, lead, mercury, and thallium were found in concentrations exceeding background levels in the Motor Pool Pond area. Beryllium, cadmium, chromium and lead were most frequently detected above background levels. Beryllium concentrations ranged from 0.22 to 1.4 mg/kg (milligrams per kilogram or parts per million), cadmium from 0.53 to 38.8 mg/kg, chromium from 8.2 to 91.3 mg/kg, and lead from 10.6 to 631 mg/kg. The highest metals concentrations were found in the sediments in the ditch from 0 to 2 m (0 to 7 ft) in depth, and in sediments excavated from the ditch.

In addition, four organic compounds (acetone, 2-butanone, 4-methyl 2-pentanone, and methylene chloride) were detected at a depth of 4 m (13 ft) in the pond sediments. The maximum concentrations in the sediments were 85 µg/kg (micrograms per kilogram or parts per billion), 90 µg/kg, 40 µg/kg, and 40 µg/kg, respectively. Methylene

Table 1. Summary of analytical results for samples collected at the CFA Motor Pool Pond.

Chemical	Frequency of detection[a]	Frequency of detection greater than background[b]	Estimated upper range of background[bc]	Range of detected concentrations	Units
Antimony	41/41	0/41	5.8	1.7 - 5.8	mg/kg
Arsenic	41/41	0/41	22.1	1.4 - 18.4	mg/kg
Barium	41/41	1/41	334.5	92.8 - 434	mg/kg
Beryllium	41/41	13/41	<0.23	0.22 - 1.4	mg/kg
Cadmium	41/41	11/41	1.6	0.53 - 38.8	mg/kg
Chromium	41/41	9/41	30.7	8.2 - 91.3	mg/kg
Lead	41/41	14/41	50.2	10.6 - 631	mg/kg
Mercury	2/4	2/4	<0.09	0.35 - 1.2	mg/kg
Nickel	41/41	0/41	42.8	13.6 - 37.7	mg/kg
Thallium	11/41	2/41	0.6	0.3 - 1.0	mg/kg
Methylene Chloride	6/41	6/41	(0)	3.0 - 40.0	µg/kg
Acetone	1/41	1/41	(0)	85.0	µg/kg
2-Butanone	1/41	1/41	(0)	90.0	µg/kg
4-Metyl-2-Pentanone	2/41	2/41	(0)	5.0 - 40.0	µg/kg
Tetrachloroethene	2/41	2/41	(0)	4.0 - 76.0	µg/kg
Aroclor-1260	1/2	1/2	(0)	1,470	µg/kg
Cesium-137	21/38	NA	(0)	0.17 - 8.41	pCi/g
Americium-241	3/3	NA	(0)	0.17 - 2.72	pCi/g
Plutonium-239	3/3	3/3	(0)	0.14 - 4.29	pCi/g

a. Replicate samples are not included in the total number of samples.
b. (0) - Background concentrations are assumed to be zero (assumed to be man-made and not naturally occurring).
NA - Background concentrations not available for CFA Motor Pool Pond.
c. Values determined by calculating the 95% upper confidence limit (UCL) of the arithmetic mean.

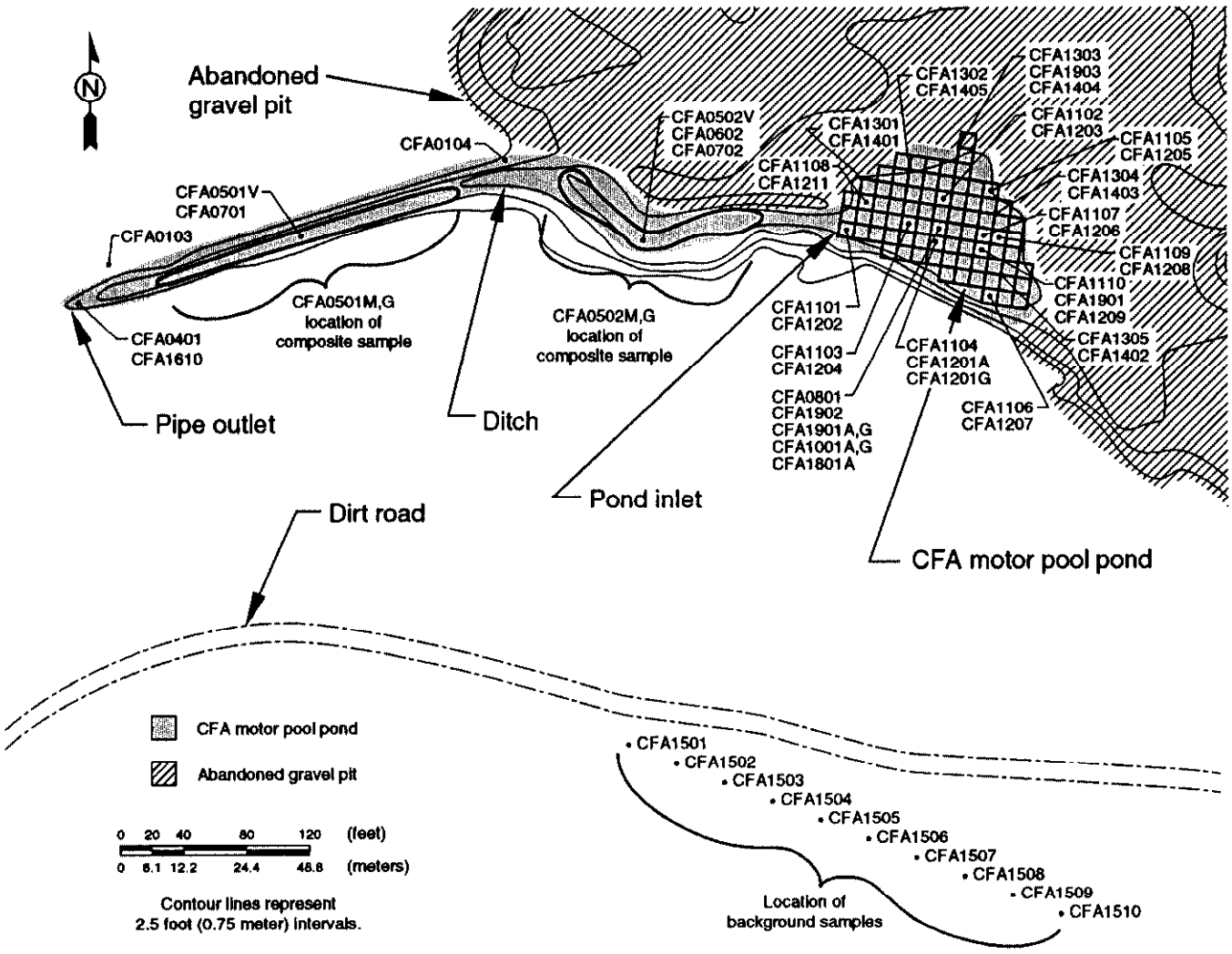


Figure 3. Map of the CFA Motor Pool Pond and sediment sample locations. R93 0085

chloride and tetrachloroethylene were also detected in two samples collected from excavated sediments, with maximum concentrations of 40 µg/kg and 76 µg/kg, respectively. The PCB Aroclor-1260 was detected in the sample and its replicate collected from the ditch near the pipe outlet. The maximum concentration was 1,470 µg/kg. The radionuclides americium-241, cesium-137, and plutonium-239 were detected in surface sediments in the ditch and pond area. The highest concentrations of each detected radionuclide were 2.72 pCi/g for americium-241, 8.4 pCi/g for cesium-137, and 4.29 pCi/g for plutonium-239.

Metals of potential concern in the sediments are:

- Americium-241, chromium-VI, cesium-137, and plutonium-239, which are classified as Group A human carcinogens
- Cadmium, a Group B1 probable human carcinogen
- Beryllium and lead, Group B2 probable human carcinogens
- Barium and chromium-III, noncarcinogens which may have adverse human health effects.

Another contaminant of concern is the PCB Aroclor-1260, which is classified as a Group B2 probable human carcinogen.

The potential for migration of contaminants to groundwater was evaluated by two methods. The first method was the use of conservative assumptions and conventional flow equations to estimate the travel time to the aquifer. The second method was the use of a simplified contaminant transport model, GWSCREEN (See Section 5.2 of the RI Report). This evaluation indicates that regulatory standards for groundwater would not be exceeded due to migration of contaminants from the CFA Motor Pool Pond sediments.

The potential pathways for exposure to humans at the CFA Motor Pool Pond and those selected for risk assessment include (1) direct atmospheric transport (inhalation), (2) dermal contact with contaminants, (3) direct ingestion by workers or future residents, and 4) exposure to ionizing radiation emitted by radioactive contaminants in pond sediments.

Potential exposure scenarios for which the pathways were evaluated at the CFA Motor Pool Pond were limited to present occupational and future residential users. The potential for exposure to the public is currently limited due to the restricted access policy at the INEL. However, a residential scenario was evaluated because it is possible a home could be built on the site in the future. For the risk assessment, it was assumed that residential development will not occur for at least 30 years so a 30-year scenario was evaluated. A 100-year residential scenario was also evaluated. The timing of the residential scenario is considered in the radiological risk assessment because radionuclides decay over time.

6. SUMMARY OF SITE RISKS

The risk assessment for the CFA Motor Pool Pond considered both human health and ecological risks. The human health risk assessment was conducted in accordance with the EPA *Risk Assessment Guidance for Superfund* as supplemented by the EPA Region 10 risk assessment guidance. A qualitative ecological risk assessment was also conducted. Risk assessment results are summarized in the following sections.

6.1 Human Health Risk

The contaminants found in the CFA Motor Pool Pond were evaluated to identify those that contribute the greatest potential risk. A concentration-toxicity screen was used which involved ranking each contaminant by its highest detected concentration multiplied by a chemical-specific risk factor developed by EPA. Using this methodology, any contaminant that contributed more than 1% to the total risk was retained for consideration in the baseline risk assessment. The concentration-toxicity screen identified chromium, barium, and lead as the main contributors of noncarcinogenic risk. The main contributors to carcinogenic risk are chromium-VI, cadmium, beryllium, Aroclor-1260, and all detected radionuclides. The contaminant concentrations used in the risk assessment calculations are listed in Table 2.

A human health risk assessment was performed to evaluate current-use (occupational) and future-use (residential) scenarios. For each scenario, health risks were estimated using EPA default parameters and site-specific parameters. The EPA default exposure parameters are conservative and are used to establish a baseline for comparison. A site-specific risk assessment was then developed that reflects site conditions as they exist today and are likely to exist in the future.

The site-specific assessments used lower exposure frequencies (EF) than the default risk assessment (Table 3). These lower exposure frequencies were based on observations at CFA. The default EF value for the occupational scenario was 250 days per year for all exposure routes. Under the site-specific occupational scenario, the EF was

Table 2. Contaminant concentrations in the CFA Motor Pool Pond used in the baseline risk assessments.

Contaminant	Occupational (present day)[a,b]	Residential (30-year)[a]	Residential (100-year)[a]
Cesium-137	2.24	1.12	0.22
Americium-241	2.72[c]	2.60	2.34
Plutonium-239	4.29[c]	4.29	4.28
Aroclor-1260	1240[d]	1240	1240
Barium	220	220	220
Beryllim	0.97	0.97	0.97
Cadmium	11.22	11.22	11.22
Chromium-VI	5.6	5.6	5.6
Chromium-III	34.4	34.4	34.4
Lead	176	176	176

a. Units are pCi/g for radionuclides and mg/kg for metals.
b. Values determined by calculating the 95% UCL of the arithmetic mean.
c. Highest detected alpha concentration was used.
d. For Aroclor-1260 an average of one sample with a detectable concentration and its replicate was used and the units used are µg/kg.

Table 3. Exposure Frequencies.

Exposure Pathway	Occupational Default (days/year)	Occupational Site-specific (days/year)	Future Residential Default (days/year)	Future Residential Site-specific (days/year)
Inhalation	250	12.5	350	350
Ingestion - child			350	50
Ingestion - adult	250	2.5	350	50
Dermal contact	250	2.5	350	50
Direct radiation	250	2.5	350	50

12.5 days per year for inhalation and 2.5 days per year for the other exposure routes. The 12.5 day figure represents the 5 percent of the time the buildings at CFA are downwind of the Motor Pool Pond. The 2.5 day figure is 1 percent of the default value of 250 days and is based on the fact that CFA workers do not occupy the pond to perform necessary work duties and therefore, are not expected to be exposed more than 2.5 days per year.

The default EF for the future residential scenario was 350 days per year for all exposure routes. Under the site-specific future residential scenario, the EF was 350 days per year for inhalation and 50 days per year for the other exposure routes. The time future residents would spend outdoors is the limiting factor for direct ingestion, dermal contact, and direct ionizing /radiation exposures. The amount of time spent outdoors has been estimated to be at

50 days per year for men and women (Exposure Factors Handbook, Final Report, U.S. EPA, EPA/600/8-89/043, May 1989). Limited data for children suggest the maximum average time spent outdoors during the school year is 14 days per year for boys, ages 12 to 17 years. This average only includes days of the school year; summer vacation time is not included (EPA, U.S. Environmental Protection Agency, Exposure Factors Handbook, EPA/600/8-89/043, March 1990b). The exposure frequency during the 12-week summer vacation was estimated to be three days outdoors per week, for a total of 36 days.

Contaminant intake rates were calculated for inhalation, ingestion, and dermal contact for metals and radionuclides. The parameters used to calculate intakes were based on EPA methods found in the *Risk Assessment Guidance for Superfund,* Volume I, "Human Health Evaluation Manual, Part A." For noncarcinogens, the calculated contaminant intake rates and absorbed doses for each contaminant and exposure route were compared to reference doses (RfDs) obtained from the EPA Integrated Risk Information System and the Health Effects Assessment Summary Tables or RfDs calculated using regulatory and occupational limits. The hazard quotients, which are the ratio of the calculated intake and the RfD for each contaminant, were summed by exposure route and scenario to obtain hazard indices. The hazard indices were compared to the EPA threshold value of 1 to determine whether non-carcinogenic effects from exposure to the contaminant may occur. No hazard indices greater than 1 were identified for the occupational scenarios, indicating that the contaminants at the CFA Motor Pool Pond do not pose unacceptable noncarcinogenic health effects to CFA workers. The hazard index for the default future residential scenario using EPA default parameters was 1.4; however, using site-specific parameters, the hazard index was 0.7 (Table 4).

Table 4. Summary of risks at the CFA Motor Pool Pond.

		Carcinogenic Risk		Hazard Index	
Scenario	**Contaminants**	**Default**	**Site-specific**	**Default**	**Site-specific**
Occupational	Radionuclides	6 in 100,000 (6E-05)	7 in 10,000,000 (7E-07)	NA[a]	NA
	Chemicals	5 in 100,000 (5E-05)	5 in 10,000,000 (5E-07)	0.7	
	Total	1 in 10,000 (1E-04)	1 in 1,000,000 (1E-06)	0.7	0.02
Future 30-year Residential	Radionculides	2 in 10,000 (2E-04)	2 in 100,000 (2E-05)	NA	NA
	Chemicals	9 in 100,000 (9E-05)	1 in 100,000 (1E-05)	1.4	0.7
	Total	3 in 10,000 (3E-04)	3 in 100,000 (3E-05)	1.4	0.7
Future 100-year Residential	Radionuclides	4 in 100,000 (4E-05)	7 in 1,000,000 (7E-06)	NA	NA
	Chemicals	9 in 100,000 (9E-05)	1 in 100,000 (1E-05)	1.4	0.7
	Total	1 in 10,000 (1E-04)	2 in 100,000 (2E-05)	1.4	0.7

a. Hazard indices are not applicable to radionuclides.

Carcinogenic health effects were evaluated by multiplying the intake rates of each carcinogen by a body absorption factor and the pertinent EPA slope factor. The result is an estimated excess lifetime cancer risk. The excess cancer risks for each carcinogen are then summed to determine the total excess cancer risk for the given scenario. For the occupational scenario, the current total carcinogenic risk to workers near the CFA Motor Pool Pond is 1 in 10,000 (1×10^{-4}) using the default parameters, and 1 in 1,000,000 (1×10^{-6}) using site-specific parameters (see Table 4).

For the default 30-year future residential scenario, the total carcinogenic risk from radionuclides and inorganic metals is 3 in 10,000 (3×10^{-4}), and 3 in 100,000 (3×10^{-5}) for the site-specific scenario. For the default 100-year future residential scenario, the total carcinogenic risk is 1 in 10,000 (1×10^{-4}), and 2 in 100,000 (2×10^{-5}) for the site-specific scenario (see Table 4).

Several sources of uncertainty, such as those associated with sampling and analysis and the use of EPA established toxicity values, are common to risk assessments and generally have a low potential for adding uncertainty to the results. Other assumptions specific to the CFA Motor Pool Pond are more important to analysis of uncertainty. For example, exclusion of lead from the carcinogenic toxicity assessment may have resulted in underestimation of the carcinogenic risk. This effect is difficult to evaluate because toxicity values are not available for lead. The use of biased samples collected in the ditch and the pond is expected to overestimate total contaminant concentration in the Motor Pool Pond, making the risk assessment more conservative. Because the potential effects of the assumptions used in the risk assessment are not quantified, it is difficult to measure the effect on total risk in numerical terms. However, on a qualitative basis, it appears there is a greater potential for overestimation of exposures and risks.

6.2 Environmental Risk

A qualitative ecological risk assessment was performed to the extent practicable on a scale as small as the CFA Motor Pool Pond. The assessment included a review of available literature on contaminant toxicity to animal species. Based on the limited distribution of the contaminants, discontinued use of the pond, sparse vegetation, and limited habitat value, it is unlikely that contaminants will be accumulated in the food chain. For these reasons, the CFA Motor Pool Pond sediments are not expected to have significant disruptive effects on animal or plant populations or the local ecosystem. Ecological effects will be further evaluated in the WAG 4 RI/FS and the WAG 10 comprehensive RI/FS. These studies are broader in scope and will enable a more representative evaluation of varied and mobile populations.

7. DECISION

The DOE has determined that no further remedial action is necessary at the CFA Motor Pool Pond to ensure protection of human health and the environment. This decision is based on the results of the human health and ecological risk assessments, which indicate that conditions at the site pose no unacceptable risk to human health or the environment. The EPA has approved the DOE decision; the IDHW concurs.

8. EXPLANATION OF SIGNIFICANT CHANGES

The Proposed Plan for the CFA Motor Pool Pond sediments was released for public comment on June 26, 1992. The Proposed Plan identified No Action as the alternative preferred by the DOE, EPA, and IDHW. The three agencies have reviewed and considered all written and verbal comments submitted during the public comment period. Upon review of comments concerning the proposed action, it was determined that no significant changes to the preferred alternative as it was presented in the Proposed Plan were necessary.